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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,758	06/27/2003	Jae-Hyun Ryou	H0004788	7402
22913	7590	05/17/2005	EXAMINER	
WORKMAN NYDEGGER (F/K/A WORKMAN NYDEGGER & SEELEY) 60 EAST SOUTH TEMPLE 1000 EAGLE GATE TOWER SALT LAKE CITY, UT 84111			NGUYEN, TUAN N	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/607,758

Applicant(s)

RYOU ET AL.

Examiner

Tuan N. Nguyen

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1- 27 is/are pending in the application.
- 4a) Of the above claim(s) 21-26 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-3, 12-19 is/are allowed.
- 6) ☒ Claim(s) 4-10 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 11/28/2003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

**Election/Restriction**

1. Applicant's election of species 1 without traverse in paper filed 03/23/2005 is acknowledged. Claims 12, 20 have been amended, claims 21-26 have been withdrawn, and claim 27 has been added.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of 35 U.S.C. 102(b) which forms the basis for all obviousness rejections set forth in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 4, 5, 10 are rejected under 35 U.S.C. 102(b) as being unpatentable over Kopf et al. (US 5115441).

With respect to claim 4, Kopf et al. '441 (Fig 1) shows a VCSEL having a top mirror (Fig 1: 17), a thermally conductive cover said top mirror (Fig 1: 22) (Col 5: 25-40, metallic layer).

With respect to claim 5, (Fig 1: 23,22) shows a thermally conductive material connected to the thermally conductive cover (Col 5: 25-40, metallic layer)(electrode 23, on top conductive cover 22).

With respect to claim 10, (Fig 1: 23) shows a heat sink connected to thermally conductive cover (Fig 1: 23, 22; electrode over thin metallic layer).

4. Claim 27 is rejected under 35 U.S.C. 102(b) as being unpatentable over Scott (US 6160834).

Art Unit: 2828

With respect to claim 27, Scott '834 (Fig 1) shows a VCSEL comprising a substrate (Fig 1: 12), a first mirror on substrate (Fig 1: 14), an active region on first mirror (Fig 1: 16), a second region on active region (Fig 1: 18), a contact on the second mirror (Fig 1: 32), and a thermally conductive structure arranged for thermal communication with a portion of at least one of first or second mirror (Fig 1: 10, 34).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or non-obviousness.
5. Claims 6, 7, 8, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kopf et al. (US 5115441) in view of Johnson et.al. (US 6493366).

With respect to claims 6 and 7, the claims further require that the top mirror comprised InP based material and wavelength be 1200 and 1800nm. Kopf '441 discloses the above, however, did not discretely disclose the material of the top mirror layer or the wavelength

Art Unit: 2828

produce by the VCSEL, however Kopf '411 did disclose varying the thickness of the layers (Col 5: 1-20) for optimizing wavelength output. Johnson et al. '366 discloses a VCSEL having top and bottom DBR mirror make from Group III-V materials, where the top mirror (Fig 2: 18) is InP base material. It would have been obvious to one of ordinary skill in the art to provide Kopf '441 material base as taught or suggested by Johnson et al. '366, for the benefit of controlling or optimizing specific light wavelength output.

With respect to claims 8, 9 Kopf '411 discloses the thermally conductive cover comprises materials of Au, Ag, Cr, Ti and the like (Col 9: 20-25).

### **REASON FOR ALLOWANCE**

#### ***Allowable Subject Matter***

6. The following is an examiner's statement of reasons for allowance - Applicant's response filed on 12/15/2004 has been considered, with respect to claims 1, 8, and 10, the references of the record fail to teach or suggest:

#### **Claim 1,12:**

A VCSEL comprising a substrate, first mirror, an active region, and a second mirror stacked in the above sequence, *where a first contact and a thermally conductive layer or a low thermally conductive layer situated on the first and the second portion of the second mirror, wherein the thermally conductive layer also thermally connected to the first contact.*

#### **Claim 20:**

A VCSEL comprising a substrate, first mirror, an active region, and a second mirror stacked in the above sequence, *where there is a dielectric mirror that is thermally conductive*

Art Unit: 2828

*and a first contact on the second mirror, and a metal interconnecting a second contact and in contact with the edge of said dielectric mirror.*

7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Allowable Subject Matter***

8. Claim 11 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The references of the record fail to teach or suggest:

**Claim 11:**

A first contact situated on said top mirror and thermally connected to said thermally conductive cover and said heat sink.

***Communication Information***

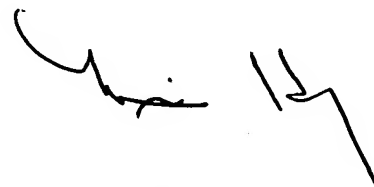
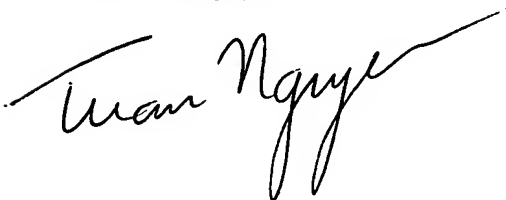
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan N Nguyen whose telephone number is (571) 272-1948. The examiner can normally be reached on M-F: 7:30 - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harvey Minsun can be reached on (703) 308-16741. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2828

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tuan N. Nguyen



MINSUN CH HARVEY  
PRIMARY EXAMINER